

31.(new) The balloon catheter as claimed in claim 1 wherein the inner tube is co-axial with the outer tube.

32.(new) The balloon catheter as claimed in claim 1 wherein the inner tube is at least partially connected along its length to the outer tube.

33.(new) The balloon catheter as claimed in claim 18 wherein the fiberoptic sensor is a fiberoptic pressure sensor.

34.(new) The balloon catheter as claimed in claim 19 wherein the fiberoptic sensor is a fiberoptic pressure sensor.

REMARKS

Claims 31-34 have been added. Applicant has also amended claims 1, 16 and 18 to clarify the language detailing the connection between the tip, the distal end of the balloon membrane and the distal end of the inner tube or inner lumen extension tube. The language now more clearly requires the tip to be connected to the distal end of the balloon membrane and the distal end of the inner tube or inner lumen extension tube. Claim 1 was further amended to remove the unnecessary limitation that the fiber be at least partially connected to the inner tube.

The Examiner rejected claims 1-5 and 16-17 under 35 U.S.C. 103(a) as being unpatentable over combined teachings of U.S. Patent No. 5,928,155, issued to Eggers et al. (hereinafter "Eggers") and U.S. Patent No. 6,024,693, issued to Shocke et al. (hereinafter "Schock").

Referring to Figures 9 and 12 of Eggers, catheter 60 comprises a tip region 62 including a balloon 64, a temperature sensor 192, fluid-filled pressure sensing lumen

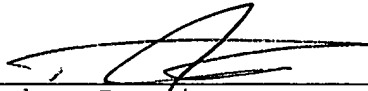
22 and fiber optic assemblies 236 and 238. Temperature sensor 192 measures temperature (see col. 19, lines 27-30). Lumen 22 is filled with a fluid used to measure pressure (see col. 20, lines 5-7). Fiberoptic assemblies 236 and 238 measure pH and analyte concentration (see col. 20, lines 35-37).

Claims 1, 8, and 16 have been amended to require that fiberoptic sensor be a fiberoptic pressure sensor. The Egger catheter does not have a fiberoptic pressure sensor. In Egger, pressure is measured via fluid filled lumen 22 and fiberoptic assemblies 236 and 238 are not pressure sensors. Further, Schock does not teach the use of a fiberoptic pressure sensor.

Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Abraham Ronai, Applicants' Attorney at 201-307-5350 so that such issues may be resolved as expeditiously as possible.

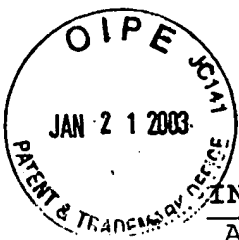
Respectfully Submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Schock, et al.

Application No.: 09/734,755

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Title: INTRA-AORTIC BALLOON
CATHETER HAVING A
FIBEROPTIC SENSOR

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Group Art Unit: 3743

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CLAIMS WITH AMENDMENTS SHOWN

1.(amended) A balloon catheter comprising a balloon membrane, a tip, a fiberoptic pressure sensor connected to said tip, a fiberoptic fiber, an outer tube, and an inner tube disposed within an outer surface of said outer tube, said inner tube extending beyond a distal end of the outer tube, [a distal end of the balloon membrane being connected to the tip and to a distal end of the inner tube] the tip being connected to a distal end of the balloon membrane and to a distal end of the inner tube, said fiberoptic fiber being connected on a distal end to the fiberoptic pressure sensor [and proximal to the fiberoptic sensor being at least partially connected along its length to the inner tube].

8.(amended) The balloon catheter as claimed in claim 1 wherein the tip comprises an inner surface, an outer surface, and a pocket, said inner surface defining a tip lumen extending from a proximal end of the tip to a distal end of the tip, and wherein the fiberoptic pressure sensor has a pressure sensing surface, the fiberoptic pressure sensor is embedded in the tip such that the pressure sensing surface is exposed to said pocket.

16.(amended)A balloon catheter system comprising a fiberoptic sensor catheter and a balloon catheter, said balloon catheter comprising a balloon membrane, a tip having a tip lumen, an outer tube, and an inner tube disposed within an outer surface of said outer tube, said inner tube extending beyond a distal end of the outer tube, [a distal end of the balloon membrane being connected to the tip and to a distal end of the inner tube] the tip being connected to a distal end of the balloon membrane and to a distal end of the inner tube, said fiberoptic sensor catheter comprising a tube having a fiberoptic pressure sensor connected to a distal end, said fiberoptic pressure sensor being connected to a distal end of a fiberoptic fiber which is connected to the tube, said fiberoptic sensor catheter fitting within the inner tube and in the tip lumen.

18.(amended) An intra-aortic balloon catheter comprising a co-lumen tube, a balloon membrane, an inner lumen extension tube, and a tip, said co-lumen tube having an outer lumen inner surface, defining an outer lumen, and an inner lumen inner surface, defining an inner lumen, said inner lumen having a smaller cross sectional area than said outer lumen, a proximal end of the inner lumen extension tube and a proximal end of the balloon membrane are connected to a distal end of the co-lumen tube, [the tip, a distal end of the inner lumen extension tube, and a distal end of the balloon membrane are connected,] the tip is connected to a distal end of the inner lumen extension tube and to a distal end of the balloon membrane, said tip having an outer surface, an inner surface, defining an inner tip lumen, and a pocket, a fiberoptic sensor is embedded in the tip such that a pressure sensing surface of the fiberoptic sensor is exposed to said pocket.